SK2000 Series
Pure Sine Wave Inverter
User's Manual

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1. Important Safety Instructions

WARNING!

Before using the Inverter, read and save the safety instructions.

1-1. General Safety Precautions

1-1-1. Do not expose the Inverter to rain, snow, spray, bilge or dust. To reduce risk of hazard, do not cover or obstruct the ventilation openings. Do not install the Inverter in a zero-clearance compartment. Overheating may result.

1-1-2. To avoid a risk of fire and electronic shock. Make sure that existing wiring is in good electrical condition; and that wire size is not undersized.
Do not operate the Inverter with damaged or substandard Wiring.

1-1-3. This equipment contains components which can produce arcs or sparks. To prevent fire or explosion do not install in compartments containing batteries or Flammable materials or in locations which require ignition protected equipment. This includes any space containing gasoline-powered machinery, fuel tanks, or joints, fittings, or other connection between components of the fuel system.

1-2. Precautions When Working with Batteries

1-2-1. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 20 minutes and get medical attention immediately.

1-2-2. Never smoke or allow a spark or flame in vicinity of battery or engine.

1-2-3. Do not drop a metal tool on the battery. The resulting spark or short-circuit on the battery of other electrical part may cause an explosion.

1-2-4. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery,
A lead-acid battery produces a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.

2. Features

- Pure sine wave output (THD < 3%)
- Output frequency 50 / 60Hz switch selectable
- Input & output fully isolation design
- Low power " Power Saving Mode " to conserve energy
- High efficiency 88~94%
- Capable of driving highly reactive & capacitive loads at start moment.
- Tri-Color indicators display input voltage & output load level
- Loading controlled cooling fan
- Advanced microprocessor
- Protection Input low voltage Overload Short circuit
  Low battery alarm Input over voltage Over temperature

2-1. Application

2-1-1. Power tools – circular saws, drills, grinders, sanders, buffers, weed and hedge trimmers, air compressors.

2-1-2. Office equipment – computers, printers, monitors, facsimile machines, scanner.

2-1-3. Household items – vacuum cleaners, fans, fluorescent and incandescent lights, shavers, sewing machines.

2-1-4. Kitchen appliances – microwave ovens, refrigerators and freezers, coffee makers, blenders, ice markers, toasters.

2-1-5. Industrial equipment – metal halide lamp, high – pressure sodium lamp.

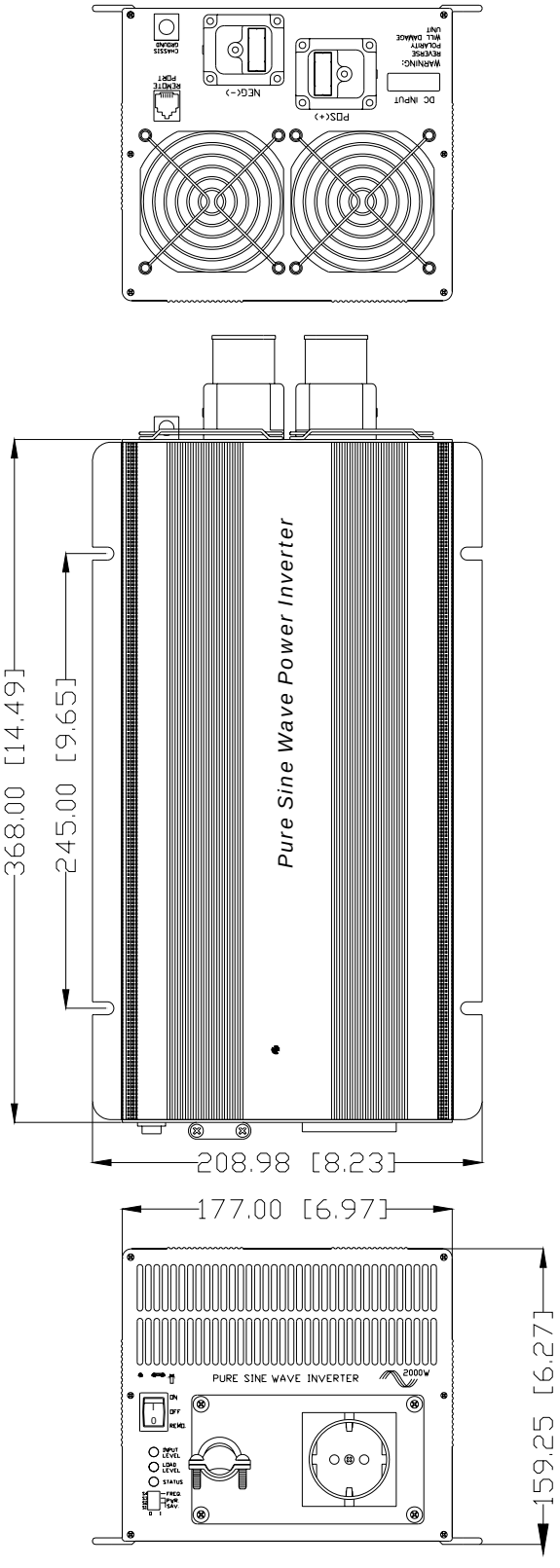
2-1-6. Home entertainment electronics – television, VCRs, video games, stereos, musical instruments, satellite equipment.

2-2. Electrical Performance

Specification	Model No.					
Item	SK2000-112	SK2000-124	SK2000-148	SK2000-212	SK2000-224	SK2000-248
Continuous Output Power	2000W					
Maximum Output Power (3Min.)	2300W					
Surge Rating	4000W					
Input voltage	12V	24V	48V	12V	24V	48V
Output Voltage	100 / 110 / 120V +/- 3%			220 / 230 / 240V +/- 3%		
Frequency (Switch Selectable)	50 / 60Hz +/- 0.05%					
Output Waveform	Pure Sine Wave (THD < 3%)					
Efficiency (full load)	89.0%	92.0%	93.0%	91.0%	94.0%	95.0%
No Load Current Draw	2.8A	1.5A	0.7A	2.8A	1.5A	0.7A
Stand-By Current Draw	0.50A	0.30A	0.16A	0.50A	0.25A	0.12A
Input Voltage Regulation	10.5-15 VDC	21.0-30 VDC	42-60 VDC	10.5-15 VDC	21.0-30 VDC	42-60 VDC
Input Level Indicator	Red / Orange / Green LED					
Load Level Indicator						
Failure Indicator	Red LED					
Protection	Overload, Short Circuit, Reverse Polarity (Fuse), Over / Under Input Voltage, Over Temperature.					
Remote Control Unit	CR-6 / CR-8 Optional					
Safety	UL458			EN60950		
EMC	FCC Class A			EN55022: 1997 EN55024: 1997 EN61000-3-2: 1998 EN61000-3-3: 1995		e-Mark
Operating Temperature Range	0 - 40					
Storage Temperature Range	-30 to 70					
Cooling	Loading controlled cooling fan (65 ON , 45 OFF)					
Dimensions	422(L)*208(W)*160(H)mm / 16.6(L)*8.18(W)*6.30(H) Inch					
Weight	9 kg / 19.8 Lbs.					

Note: The specifications are subject to change without notice.

2-3. Mechanical Drawings

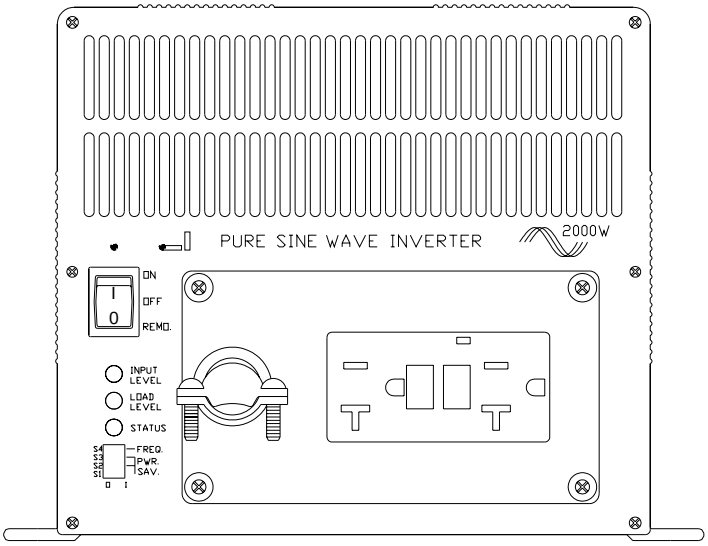


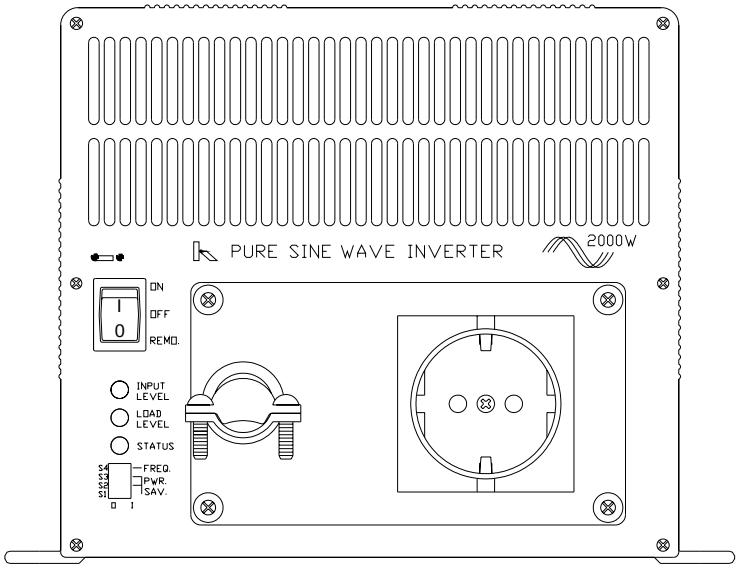
3. Introduction

This power inverter series is a the member of the most advanced line of mobile AC power systems available.
To get the most out of the power inverter, it must be installed and used properly. Please read the instructions in this manual before installation and operation this model.

3-1. Front Panel Operations

3-1-1. Front view





3-1-2. ON / OFF/ REMOTE (Main) switch

a. Before installing the inverter, make sure the main switch must be “OFF”.
b. Before using the remote unit, make sure the main switch must be “ REMOTE”.

3-1-3. Input Level Display Input Voltages

LED Status	DC 12V	DC 24V	DC 48V
RED Blink (slow)	10.5~10.9	21.0~21.8	42.0~43.6
RED	10.9~11.3	21.8~22.6	43.6~45.2
ORANGE	11.3~12.0	22.6~24.0	45.2~48.0
GREEN	12.0~14.0	24.0~28.0	48.0~56.0
ORANGE Blink	14.0~14.7	28.0~29.4	56.0~58.8
OVER RED BLINK	14.7↑	29.4↑	58.8↑

3-1-4. Load Level Display AC Loads (Watts)

LED Status	Load Condition
DARK	0 ~ 100W
GREEN	100W ~ 660W
ORANGE	660W ~ 1500W
RED	1500W ~ 1920W
RED BLINK	Over 1920W

3-1-5. AC Frequency Selected by “S4” Dip Switch

Frequency	S4
50 HZ	OFF
60 HZ	ON

3-1-6. Status Display Power & Fault Status

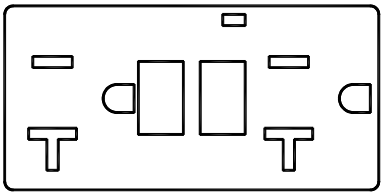
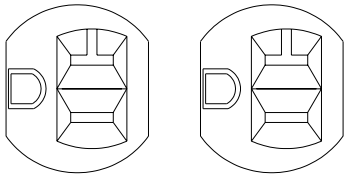
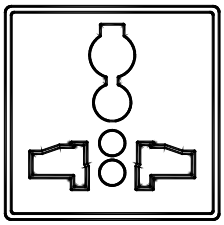
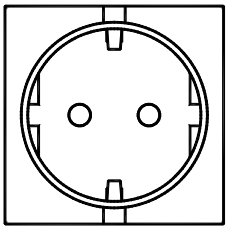
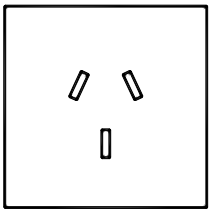
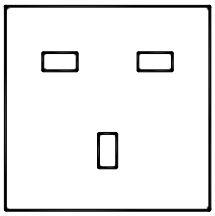
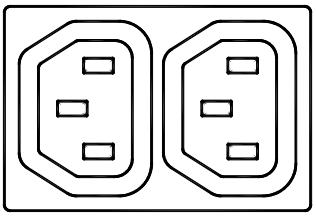
Green LED	LED Signal	Status
Solid	———————	Power OK
Blink (Slow)	– – – –	Power Saving
Red LED	**LED Signal**	**Status**
Blink (Fast)	– – – – – – – – – –	OVP
Blink (Slow)	– – – –	UVP
Blink (Intermittently)	- - - - - -	OTP
Solid	———————	OLP

3-1-7. Power Saving is enable and adjusted through dip switches S1, S2 and S3 on the front of the inverter

Example: With the watt setting at 40W, a 40W or greater load will “wake up” the inverter and the load will operate normally. Any load less than 40W will not operate and the inverter will remain in power save made.

Power saving	S1	S2	S3
DISABLE	OFF	OFF	OFF
40W	ON	OFF	OFF
80W	OFF	ON	OFF
100W	ON	ON	OFF
120W	OFF	OFF	ON
160W	ON	OFF	ON
180W	OFF	ON	ON
220W	ON	ON	ON

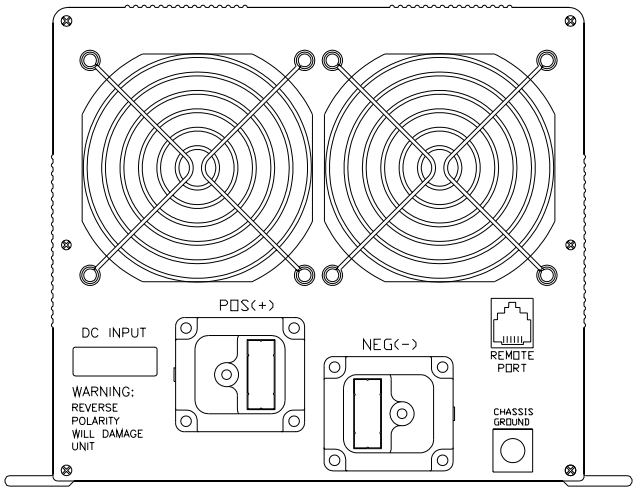
3-1-8. AC outlets (available):

North America (GFCI)	NEMA 5-20R
	
Universal	**Continental European**
	
Australia / New Zealand	**United Kingldom**
	
IEC-2	
	

WARNING!

Never connect the inverter's output to the AC distribution grid, such as your household AC wall outlet. It will damage the inverter.

3-2. Rear Panel Operations



3-2-1. Remote Port:

The SK2000 Series Inverter can be compatible with any of remote controllers, CR-6, CR-7 or CR-8.
Before using the remote unit, make sure the main switch must be " REMOTE".

3-2-2. Fan Ventilation:

Do not obstruct, allow at least 1 inch for proper air flow.

3-2-3. DC Input Terminals

Connect to 12V / 24V / 48V battery or the other power sources. is positive, is negative. Reverse polarity connection will blow internal fuse and may damage inverter permanently.

Model	DC Input Voltage	
	Minimum	Maximum
SK2000-112 SK2000-212	10.5	15.0
SK2000-124 SK2000-224	21.0	30.0
SK2000-148 SK2000-248	42.0	60.0

3-2-4. Chassis Ground: using # 8 AWG wire to connect vehicle chassis.

WARNING!

Operation of the inverter without a proper ground connection may result in an electrical safety hazard.

3-3. Protections Features:

Model	DC Input (VDC)					Over Temperature Protection			
	Over Voltage		Under Voltage Alarm	Under Voltage		**INTERIOR**		**HEAT SINK**	
	Shut-down	**Restart**		Shut-down	**Restart**	Shut-down	**Restart**	Shut-down	**Restart**
SK2000-112 SK2000-212	**15.3**	**14.2**	**11.0**	**10.5**	**12.5**	**70**	**45**	**90**	**60**
SK2000-124 SK2000-224	**30.6**	**28.4**	**22.0**	**21.0**	**25.0**				
SK2000-148 SK2000-248	**61.2**	**56.8**	**44.0**	**42.0**	**50.0**				

3-4. Installation

Where to install. The power inverter should be installed in a location that Meets the following requirements

3-4-1. Dry – Do not allow water to drip or splash on the inverter.

3-4-2. Cool – Ambient air temperature should be between 0 and 40 , the cooler the better.

3-4-3. Safe – Do not install in a battery compartment or other areas where flammable fumes may exist, such as fuel storage areas or engine compartments.

3-4-4. Ventilated – Allow at least one inch of clearance around the inverter for air flow. Ensure the ventilation openings on the rear and front of the unit are not obstructed.

3-4-5. Dust – Do not install the Inverter in a dusty environments where are dust, wood particles or other filings/shavings are present. These dust can be pulled into the unit when the cooling fan is operating.

3-4-6. Close to batteries – Avoid excessive cable lengths but do not install the Inverter in the same compartment as batteries.
Use the recommended wire lengths and sizes (see section 3-4).
Also do not mount the Inverter where it will be exposed to the gases produced by the battery.
These gases are very corrosive and prolonged exposure also will damage the Inverter.

WARNING!

Shock Hazard. Before proceeding further, carefully check that the Inverter is NOT connected to any batteries, and that all wiring is disconnected from any electrical sources. Do not connect the output terminals of the Inverter to an incoming AC source.

3-5. Making DC Wiring Connections

Follow this procedure to connect the battery cables to the DC input terminals of the Inverter. Your cables should be as short as possible (Ideally, less than 6 feet / 1.8 meters) enough to handle the required current in accordance with the electrical codes or regulations application. Cables are not an adequate gauge (too narrow) or too long will decrease the inverter performances such as poor surge capability and low input voltage warnings frequently and shutdowns. UVP warning presents due to DC voltage drop across the cables from the inverter to the batteries.

The longer or narrower the cables, the greater the voltage drop. Increasing your DC cable size will help improve the situation.

Following cable recommendations for the best performance of inverter. (Apply both 120V and 230V versions)

Model No	Wire AWG	Inline Fuse
SK2000-112	# 2/0	250A
SK2000-212	# 2/0	250A
SK2000-124	# 1/0	125A
SK2000-224	# 1/0	125A
SK2000-148	# 2	70A
SK2000-248	# 2	70A

WARNING!

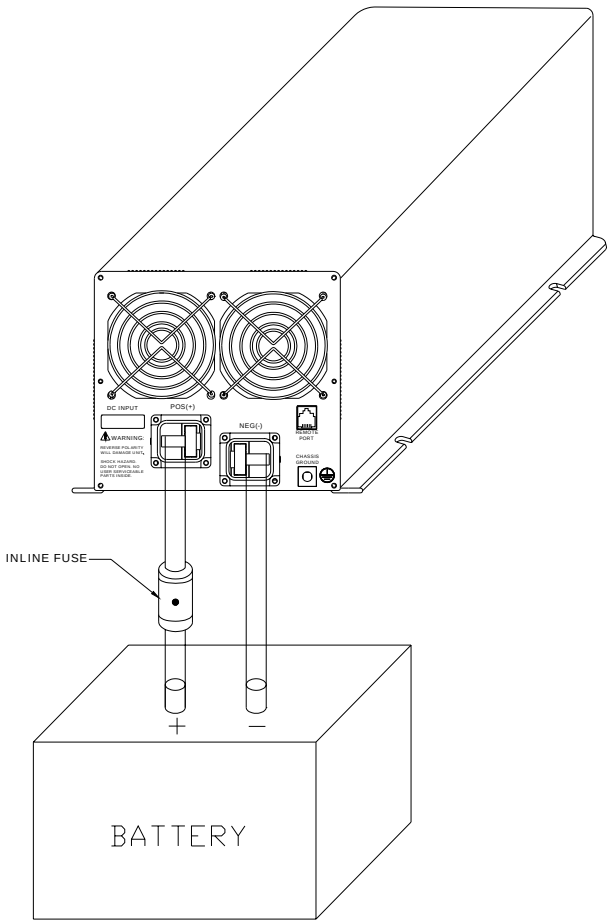
Make sure all the DC connections are tight (torque to 9 – 10 ft-lbs, 11.7 – 13 Nm). Loose connections could result overheat in a potential hazard.

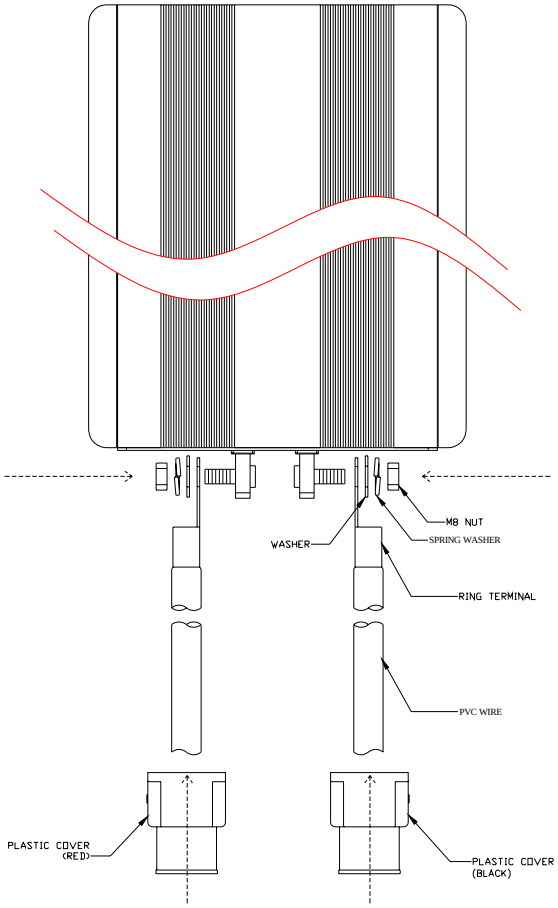
WARNING!

The installation of a fuse must be on positive cable. Failure to place a fuse on “+” cables running between the inverter and battery may cause damage to the inverter and will void warranty.

Also, use only high quality copper wire and keep cable length short, a maximum of 3 - 6 feet.

SK2000





3-5-1. Unpack and inspect the power inverter to check its performance, switch to OFF position.

3-5-2. Connect the cables to the power input terminals on the rear panel of the inverter. The red terminal is positive (+) and black terminal is negative (-). Insert the cables into the terminals and tighten screw to clamp the wires securely.

CAUTION !

Reverse polarity connection will blow a fuse in inverter and may permanently damage the inverter.
Damage caused by reverse polarity connection is not covered by warranty.

3-6. AC Safety Grounding

The AC output ground wire should go to the grounding point for your loads (for example, a distribution panel ground bus).

3-6-1. Neutral Grounding (GFCI'S)

3-6-1-1. **120V models** The neutral conductor of the AC output circuit of the Inverter is automatically connected to the safety ground during inverter operation. In accordance with the National Electrical Code requirements that separately derived AC sources (such as inverter and generators) have their neutral conductors tied to ground in the same way that the neutral conductor from the utility is tied to ground at the AC breaker panel. For models configured with a transfer relay, while AC utility power is presenting and the Inverter is in bypass mode, this connection (neutral of the Inverter's AC output to input safety ground) is not present so that the utility neutral is only connected to ground at your breaker panel, as required.

3-6-1-2. **230V models** There is no connection made inverter interior between either the line or neutral conductor to the safety ground.

WARNING!

Risk of electronic shock. Use only Pass and Seymour, type 2091-W or 2094-W, ground – fault circuit-interrupter receptacles. Others may fail in operating the inverter when connecting to the inverter's equipment.

Ground Fault Circuit Interrupters (GFCI)

Installations in Recreational Vehicles (for North American approvals) will require GFCI protection of all branch circuit connected to the AC output of the hardwire terminal equipped Inverter. In addition, electrical codes require GFCI protection of certain receptacles in residential installations. While the pure sine wave output of the Inverter is equivalent to the waveform provided by utilities, compliance with UL standards requires us to test and recommend specific GFCI.
Cotek has tested the following GFCI – protected 20A receptacles and found that they functioned properly when connected to the output of the Inverter.

3-7. Inverter Operation

To operate the power inverter, turn the main switch ON. The power inverter is now ready to deliver AC power to your loads. If there is several loads use, turn them on separately after the inverter has been “ON” in order to prevent the OVP present caused by the surge power.

3-7-1. Set the power switch to the “ON” position and the buzzer will send out “Beep” sounds at the moment the inverter will do self-diagnosis, then the LED’s indicators will also appear various colors.
Finally the buzzer will sound another “Beep” and the Input Level and Status LED indicators will turn to “Green” color, the inverter starts working successfully.

3-7-2. Set the power switch to the OFF position, the inverter stops and all the lights that are On, go Off.

3-7-3. Set power inverter switch to the ON position and turn the test load On. The inverter should supply power to the load. If you plan to accurately measure the true output r.m.s. voltage of inverter, a meter such ad FLUKE 45 BECKMAN 4410 or TRIPLETT 4200 must be used.

4. Troubleshooting guide

WARNING!

Do not open or disassemble the Inverter.
Attempting to service the unit yourself may result in a risk of electrical shock or fire.

Problems and Symptoms	Possible Cause	Solutions
"No AC Power Output"		
STATUS illuminates the red LED		
a. Blinking fast	Over input voltage. (OVP)	Check input voltage. Reduce input voltage.
b. Blinking slow.	Low input voltage. (UVP)	Recharge battery. Check connections and cable.
c. Blinking Intermittently.	Thermal shutdown. (OTP)	Improve ventilation. Make sure ventilation openings in inverter are not obstructed. Reduce ambient temperature.
d. Solid ON.	Short circuit or Wiring error. Overload.(OLP)	Check AC wiring for short circuit. Reduce load.

5. Maintenance

Very little maintenance is required to keep your inverter operating properly.
You should clean the exterior of the unit periodically with a damp cloth to prevent accumulation of dust and dirt.
At the same time, tighten the screws on the DC input terminals.

6. Warranty

We warrant this product against defects in materials and workmanship for a period of 24 months from the date of purchase and will repair or replace any defective Power Inverter when directly returned, postage paid, to us.
This warranty will be considered void if the unit has suffered any obvious physical damage or alteration either internally or externally and does not cover damage arising from improper use such as plugging.
The unit into an unsuitable power sources attempts to operate products with excessive power consumption requirements, or use in unsuitable environments.
This is the only warranty that the company makes.
No other warranties express or imply including warranties of merchantability and fitness for a particular purpose.
Repair and replacement are your sole remedies and the company shall not be liable for damages, whether direct, incidental, special or consequential, even though caused by negligence or other fault.

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GARANTIA

TODOS LOS EQUIPOS FABRICADOS POR **AMV ELECTRÓNICA** SALEN DE NUESTROS TALLERES AJUSTADOS, NUMERADOS Y CON DOCUMENTACIÓN TÉCNICA, **SIENDO LA GARANTIA TOTAL DE 2 AÑOS.**

LA GARANTÍA CUBRE LAS SITUACIONES DE DAÑO INTRÍNSECO, Y NO LAS PROVOCADAS POR CAUSAS EXTERNAS O LA MANIPULACIÓN POR PARTE DEL USUARIO.

LA GARANTÍA SE ENTIENDE EN NUESTROS TALLERES, SIENDO POR CUENTA DEL USUARIO LOS COSTES DEL TRANSPORTE.

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